Message

From: Reddy - CDPHE, Patrick [patrick.reddy@state.co.us]
Sent: 6/16/2015 3:11:33 AM
To: Sive, Barkley [barkley_sive@nps.gov]
CC: Pierce - CDPHE, Gordon [gordon.pierce@state.co.us]; Payton, Richard [Payton.Richard@epa.gov]; jward@air-resource.com; John Vimont [john_vimont@nps.gov]; pfister@ucar.edu; Tonnesen, Gail [Tonnesen.Gail@epa.gov]; Brad Pierce [brad.pierce@noaa.gov]
Subject: Re: FW: 2014 Colorado Ozone Exceptional Events
Attachments: removed.txt; data for June 2 thru 4 intrusion event.docx; IDEA-I_RAQMS_SI_FX_20140603.pptx

Hi Barkley,

Yes, these were both upslope events. Our comments to be entered for the flags for these 2 days are:

"6/2 and 6/4: Evidence from global models and other sources suggests that Front Range O3 may have been affected by both local anthropogenic sources and possible increased free tropospheric background associated with a widespread suspected intrusion event in the West associated with a upper level low moving inland from the West Coast during the period."

Your O3, NOy, and NO plots for June 2 and 4 show O3 rising to about 60 ppb as the mixed layer deepens and before the arrival of the upslope with an urban or anthropogenic signature. We believe that this initial surge to about 60 ppb is associated with an elevated background aloft tied to a multi-state intrusion event that occurred during this period. Daytime mixing likely brought higher O3 (with a stratospheric influence) down to the surface before the upslope smog hit the site, and this higher background continued to contribute to mixed layer concentrations while upslope was underway.

I am a co-lead for a national stratospheric intrusion workgroup led by Gail Tonnessen of EPA Region 8. We are in the process of developing products for this multi-state event. We have not yet assembled these in a form that I can easily access at this point, but I will provide you with some data I have assembled on the fly just now.

Keep in mind that one of the primary purposes for the event flags is to preserve agencies' ability to prepare and submit an exceptional event package for EPA's approval. If these events are not flagged this month, then that opportunity may be lost for good. We flag events if we have a reasonable idea that there may have been a substantial stratospheric influence. If a high concentration event really affects attainment prospects, then we have a chance to go back (over a period of a couple years) and really see if all the data support the conclusion. If there is not sufficient evidence, either we won't prepare a full exceptional event package or the EPA will not concur with what we have submitted.

So neither I nor the full workgroup have yet prepared all of the products that would be needed to make a credible report, and we don't yet know if these products would fully support the flags and a subsequent exceptional event package submittal. We won't know until well after the June 30 deadline for flagging these events.

I have attached a Word document with assorted plots and data. Chris Senff of NOAA reported that their lidar at Fritz Peak saw an elevated layer with high O3(74ppb) on June 2 above this site that mixed to the surface. Brad Pierce's RAQMS model and IDEA Statospheric intrusion forecast tool also showed evidence of intrusion influences in northern Colorado during the period.

AIRNow Tech maps for June 2 and 4 show elevated O3 concentrations in brisk westerly flow on the western slope with O3 peaking at around 64 ppb at Gothic under the influence of streamers of stratospheric air out ahead of a deep trough over the far West. Isentropic potential vorticity (a tracer for stratospheric air) reached about 1 PVUs (indicating air of mixed tropospheric and stratospheric origin) at 500 mb, and Denver soundings showed dry air aloft and mixing to above 500 mb on both days (with upslope at the bottom of the mixed layer and westerlies at the top):

http://weather.uwyo.edu/cgi-bin/sounding?region=naconf&TYPE=GIF%3ASKEWT&YEAR=2014&MONTH=06&FROM=0200&TO=0500&STNM=72469

NOAA GMD N2O measurements at Niwot Ridge had pronounced inverse spikes on June 1 and 2, suggesting that low-N2O stratospheric air was mixing to the surface. NASA GMAO will be sending us plots of stratospheric tracers for this period.

There is additional data. I am at home and will be at the TOLNET workshop in Boulder on Tuesday and Wednesday. I am not yet sure of my schedule for Thursday and Friday.

Regards,

Pat

On Mon, Jun 15, 2015 at 5:20 PM, Sive, Barkley <barkley_sive@nps.gov> wrote:

Hi Pat and Gordon,

I wanted to touch base with you about the request for flagging the ozone data from ROMO in early June of 2014. Richard Payton has shared quite a bit of information with me, but I thought it might be good to set up a call to discuss this further. I've also spoken with Gabi Pfister about this (I've attached a plot she made, the png file), and she also thought these were upslope events. I've attached a plot of ozone and wind direction, and it clearly shows that these are upslope events, similar to what we say during FRAPPE (I've also attached my presentation from the FRAPPE/DAQ meeting). So, if there's a good time discuss this further (possibly this week), please let me know and I'll set it up. At this point, I can't say that I'm convinced that these data should be flagged, particularly because the meteorological conditions at the site did not seem conducive to stratospheric influences, but that's why I thought we should talk,

Again, please let me know if there are days/times that would work for you this week, and we'll go from there.

Look forward to talking with you soon,

Barkley

On Wed, Jun 10, 2015 at 1:23 PM, Payton, Richard <Payton.Richard@epa.gov> wrote:

Barkley: I suspect you need this from Colorado, regarding flagging data at Rocky Mountain National Park, if you have not already received it.

Richard Payton

EPA Region 8 Air Quality Monitoring
(303) 312-6439

From: Harshfield - CDPHE, Gregory [mailto:gregory.harshfield@state.co.us]
Sent: Wednesday, June 10, 2015 11:30 AM
To: Payton, Richard; Sharac, Timothy; John Vimont; Joe Adlhoch; jward@air-resource.com; Mike Slate; Christopher.Rogers@amec.com; Marcus Stewart
Cc: Gordon Pierce - CDPHE; Patrick Reddy - CDPHE; cindy.wike@state.co.us; Lisa Devore
Subject: 2014 Colorado Ozone Exceptional Events

Ozone Data Managers,

The Colorado Department of Public Health and Environment, Air Pollution Control Division (APCD) is currently evaluating calendar year 2014 ambient ozone data for potential stratospheric ozone intrusion events, and wildfire smoke events that may be considered for Exceptional Event status as defined by the Code of Federal Regulations Title 40 Parts 50 and 51. The APCD has identified three stratospheric intrusion events and one wildfire smoke event in 2014 that met or exceeded APCDs threshold for potential exceptional event status, of which, two intrusion events appear to have significantly affected at least one of the following Colorado based Federally operated ozone monitors. Please see the attached letter for details regarding these events. The APCD requests that our Federal partners review the attached letter and flag their relevant ozone data within AQS with the appropriate exceptional event flag. Please contact me with questions or comments.

Respectfully,

Greg

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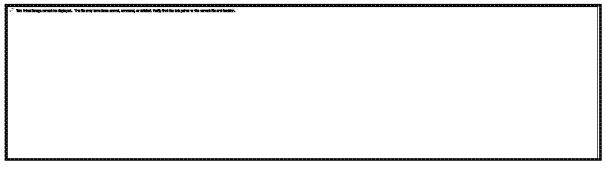
Gregory Harshfield
Gaseous and Meteorological Monitoring Group Supervisor
Technical Services Program



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